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PATENT SPECIFICATION

622,346

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COMPLETE SPECIFICATION

Improvements in or relating to Elastic or Resilient Suspension Systems

We, COMPAGNIE POUR LA FABRICATION DES COMPTEURS ET MATERIEL D'USINES A GAZ, a body Corporate under the Laws of France, of 12, Place des Etats-Unis, Montrouge, (Seine), France, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

The present invention relates to the construction of elastic suspension systems for apparatus in which are produced, vibrations, shocks or impulses of which it is desired to avoid the transmission. It also relates to the suspension of apparatus which it is desired to protect from the action of external shocks and vibrations.

This invention is very suitable for electro-magnetic resonance relays of the kind which are put into operation by musical frequency currents superposed on the current of a distributing network for electrical power. Such relays comprise essentially one or more vibrating blades tuned respectively to the various frequencies at which the relay functions. These blades are fixed in a magnetic circuit, which may be or may not be polarised, of which the exciting winding is connected as a branch in the circuit. When they resonate each of these blades drives, usually by means of a pawl fixed to the free extremity of the blade, a ratchet wheel, of which the rotation causes some operation to be carried out.

During the duration of the output of the musical frequency currents, the vibrations of the blades are transmitted to the frame of the relay. Furthermore, besides these outputs, it often happens that one or more of the blades vibrate inopportunely with small amplitudes through the action either of harmonics of the current or of current surges.

These vibrations are transmitted as a very disagreeable and undesirable noise, if the relay is placed in a chamber (in the interior of the meter, for example). Furthermore these vibrations produce losses of energy, which are not negligible.

To remedy, as far as possible, these drawbacks, it has been proposed to provide these relays with an elastic suspension which prevents the vibration being transmitted to the frame or to the stand of the apparatus.

Known embodiments of such a suspension employ either connecting members, posts or sleeves of rubber, or else plate spring systems, of different forms.

The first have a serious drawback due to the eventual age hardening of the rubber employed. The suspension then no longer has any elasticity and becomes ineffective or, if the characteristic frequency of vibration of the suspended assembly has the same value as one of the resonance frequencies of a vibrating blade, even harmful.

Elastic plate spring suspensions have not the above disadvantage but considerably increase the space taken up by the relay and are costly.

The present invention has for its object an elastic spring suspension which does not possess the disadvantages of those already known.

In accordance with the present invention we provide an elastic resilient suspension system intended for members of apparatus susceptible to vibration, comprising a frame on which the said members are suspended by at least three conical or double conical springs, which springs are disposed so that the centre of gravity both of the frame and of the members supported by the latter is in the vertical line passing through the centre of gravity of the surface defined by the points of suspension, characterised in that on the one hand the spires of smaller diameter of the springs are close together and screwed onto the ends of a threaded spindle, and in that, on the other hand, each spring and the

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threaded spindle on which the spires of smaller diameter are screwed is placed in a recess in the structure, this recess being thereafter closed by a washer set in the structure, against which the spring can take its support.

The figure in the accompanying drawing illustrates one form of embodiment according to the present invention.

The frame 1 supports the essential members of the relay. The frame 1 comprises three cylindrical recesses 2 of which one only is shown. In the recess 2 is placed a coil spring 3 of which the spires form a double cone with the apices adjacent, the end coils closely fitting the bore of the recess 2. At the central part of the double cone the coils are closed up as shown. A rod 4 threaded at its lower part has the connecting spires of the spring 3 screwed onto it. This rod 4 is provided with a shoulder 5 and a hole 6, which hole is adapted to receive a pin 7. The rod 4 is fixed in the stand 8 of the apparatus by any means, but preferably by upsetting or riveting. A washer 9 is set or riveted in the frame 1. The diameter of the orifice through the washer 9 is slightly greater than the diameter of the part of the rod 4 which passes therethrough. Furthermore, the thickness of the washer 9 is somewhat less than the distance separating the lower part of the shoulder 5 from the upper part of the pin 7.

The assembling of these different members is easy to understand. The washer 9 is passed freely on to the rod 4. Then the pin 7 is inserted in the hole 6, in which it is a press fit. The central part of spring 3 is next tightly adjusted onto the threaded part of the rod 4 which it grips firmly. The whole is introduced into the recess 2, and the washer 9 is set in the frame 1 and suitably secured, the spring 3 being thereby placed in compression. The upper extremity of the rod 4 is thereafter riveted in the stand 8.

It is easy to see that such suspension allows of controlled displacement in any direction.

The vibrations to which the relay is subject are damped by the internal friction of such a spring.

The displacement of the relay may be limited (in order to avoid deterioration during carriage, for example), and to this end the play between the member 9 on the one hand and the shoulder 5 and the pin 7 of the rod 4 on the other hand is suitably dimensioned.

In modified forms of the invention the helical spring may be simply of a conical form, and the rod 4 and the shoulder 5 may be connected in different ways.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is :—

1. An elastic resilient suspension system intended for members of apparatus susceptible to vibration, comprising a frame on which the said members, are suspended by at least three conical or double springs, which springs are disposed so that the centre of gravity both of the frame and of the members supported by the latter is in the vertical line passing through the centre of gravity of the surface defined by the points of suspension, characterised in that on the one hand the spires of smaller diameter of the spring are close together and screwed on to the ends of a threaded spindle, and that on the other hand each spring, and the threaded spindle on which the spires of smaller diameter are screwed is placed in a recess in the structure, this recess being thereafter closed by a washer set in the structure, against which the spring can take its support.

2. An elastic or resilient suspension system according to claim 1 wherein the horizontal and vertical play, between the rod and the washer is appropriately dimensioned in order to limit the displacement of the supporting structure to a given value.

3. An elastic or resilient suspension system substantially as described and illustrated with reference to the accompanying drawings.

Dated this 13th day of March, 1947.
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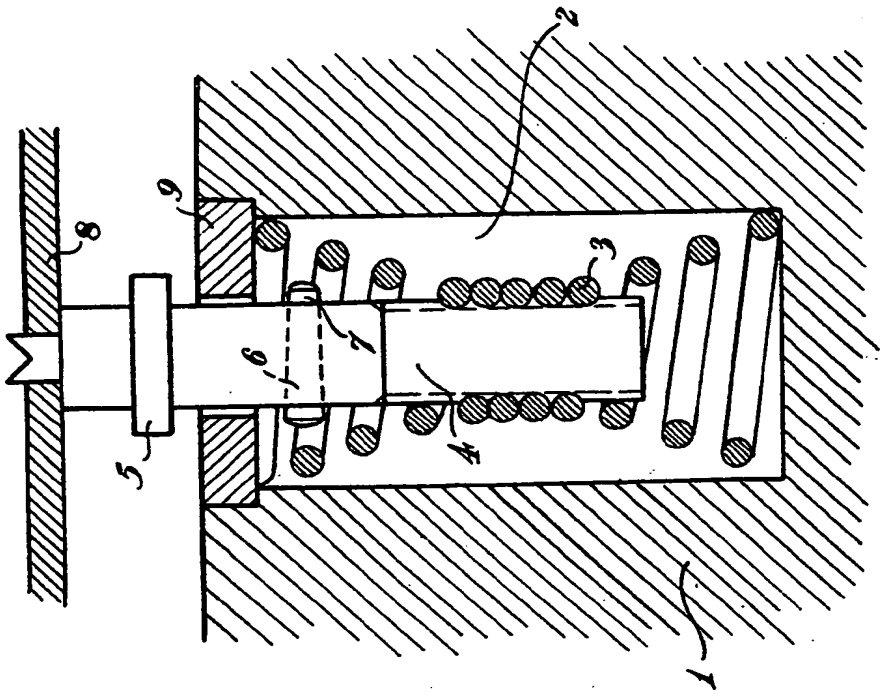
622,346 COMPLETE SPECIFICATION

1 SHEET



[This Drawing is a reproduction of the Original on a reduced scale.]

H.M.S.O.(Ty. P.)